UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

April 3, 2003

Mr. F. Andrew Piszkin
BRAC Environmental Coordinator
Base Realignment and Closure
Marine Corps Air Station, El Toro
7040 Trabuco Road
Irvine, CA 92618

RE: Draft Work Plan, Pre-Design Investigation for Shallow Groundwater Unit Remedy, IRP Site 24, Marine Corps Air Station, El Toro, dated February 28, 2003

Dear Mr. Piszkin:

EPA has reviewed the draft workplan referenced above. We found the Navy's presentation of the workplan on March 27 informative and helpful in reviewing and preparing our comments. In general, we found the workplan will address the required needs for design of the ultimate groundwater remedy. We have three areas of concern with regard to the workplan.

First, we are concerned that the proposed locations for observation wells may not be close enough to the proposed extraction wells in order to accurately observe drawdown. Second, as discussed at the meeting last week, the plan to use passive diffusion bag sampling (PDB) should address the potential for vertical migration. And finally, the Field Sampling Plan(FSP)should provide more specific direction to the field crew to ensure that field activities are carried out in accordance with the objectives of the FSP. These issues are addressed more thoroughly in the attached comments.

If you have questions, please call me at (415) 972-3012.

Sincerely,

Nicole Moutoux
Project Manager
Federal Facilities Cleanup Branch

cc: Karnig Ohannessian, SWDIV
John Broderick, RWQCB
Triss Chesney, DTSC
Marcia Rudolph, RAB Subcommittee Chair
Robert Woodings, RAB Co-Chair
Herb Levine, EPA

Comments on the Draft Work Plan, Pre-Design Investigation for Shallow Groundwater Unit Remedy
IRP Site 24, Volatile Organic Compounds Source Area
Marine Corps Air Station, El Toro, California

GENERAL COMMENTS

1. In many instances, observation wells proposed for aquifer testing are located more than 100 feet away from extraction wells; many are located more than 400 feet away. According to the Work Plan, the Site 24 aquifer is heterogeneous and extraction rates are anticipated to range from less than 5 gallons per minute (gpm) to approximately 40 gpm, and long-term yields are unknown. This illustrates the heterogeneous and potentially low yielding nature of the aquifer in this area. In addition, as Site 24 is located in an area where significant agricultural pumping occurs, observation wells should be placed such that they are within the cone of influence of the extraction well. The extraction well to be used during the aquifer test should represent the main source of hydraulic influence on the observation wells so that a measurable and steady decline in groundwater elevations can be measured in each observation well over the duration of the aquifer test. Considering these factors, we recommend the Work Plan be revised to include the following:

   a. Provide calculations that estimate the drawdown versus time at each observation well over the range of anticipated extraction rates for each aquifer test. The groundwater model recently developed can be used to assist in determining this as well as assist in locating observation wells (see next comment).

   b. Propose the installation of at least two observation wells per aquifer test (one down gradient and one cross gradient) that are located less than 50 feet from the extraction well. The proposal to use the observation wells as secondary measurement points during the aquifer tests appears appropriate. However, due to the low anticipated yields and heterogeneous nature of the aquifer, many of the currently proposed observation wells may not show measurable drawdown during the aquifer tests.

   c. Evaluate how regional pumping may influence groundwater levels during the aquifer tests and designate a control observation well for each aquifer test located beyond the anticipated cone of influence of the extraction well but screened within the same water bearing unit so it can be determined if regional groundwater levels are rising, declining or stable during the duration of each aquifer test. Provide a rationale in the Work Plan that evaluates the potential for regional groundwater pumping during the aquifer tests and the possible impact this may have on the aquifer test results and how the aquifer test data would be corrected if groundwater extraction not associated with the aquifer tests impacts the aquifer test results.

2. The proposal to use passive diffusion bag samplers (PDB) to evaluate the vertical profile of contamination in select areas seems promising, but is potentially problematic. The Work Plan for Site 24 should provide detailed and defensible rationale for the PDB sampling effort so all stakeholders can understand what and how data will be collected so that the field crew can implement the data collection effort with minimal ambiguity. For example, the text on page 3-3 states that "Samplers will be placed at a minimum 10-foot intervals (with the exception of well 18_TIC55 with intervals of 50-feet) throughout the entire well screen within these wells," while the rationale provided on Table 3-2 states "Use PDB to evaluate the vertical extent of TCE and to confirm previous observations that suggested that high TCE concentrations were associated with finer grained lithologic units." If a goal of the PDB sampling effort is to determine if lithology and concentration can be correlated vertically, it would seem appropriate to place the PDB samplers at lithology changes rather than at regular intervals. In addition, if the fine-grained zones do not transmit sufficient water, then the levels of groundwater contamination measured in the PDB samplers will be more representative of the coarser-grained zones, regardless of where the samplers are placed. Results of PDB sampling at McClellan Air Force Base (AFB) have shown that there can be representativeness issues related to contaminant profiles within screened intervals. To clarify the goals, methodology and possible limitations of the PDB sampling effort, please include the following information in the next submittal of this Work Plan:

   a. Provide a statement which clarifies the objectives and goals of PDB sampling. This should include a discussion about how the data will be used (ie, it will be used to target monitoring zones/extraction zones).

   b. Include rationale for selecting the placement depth for each PDB sampler. Specify how the field crew will install the samplers, how long the samplers will remain in the well, and how vertical migration of water within the well will be monitored.

   c. Include diagrams that illustrate how the PDB samplers will be placed vertically in each well with respect to known lithologic units. This could include profiles of the well screens and lithology versus proposed PDB sampler depths with an emphasis on the areas where the highest levels of contamination are expected.

3. A comparison conducted at Mather AFB of prefilled versus samplers filled on site found that there was less variability with the prefilled PDB sampler. We recommend that the Navy evaluate the Passive Diffusion Membrane Sampler Pilot Study conducted at Mather AFB and the Evaluation of Comparability for Passive Diffusion Membrane Sampler Results conducted at McClellan AFB.

4. The Work Plan does not include any discussion of the methodology for how the proposed aquifer tests will incorporate the known vertical stratification of the aquifer. Accounting for vertical stratification during the proposed aquifer tests is important because many of the proposed extraction wells and observation wells are screened over large intervals that span multiple fine- and coarse-grained zones. Several of the proposed extraction wells

and observation wells are or will be screened at different depths, and may only partially penetrate the saturated thickness of the aquifer. The Work Plan acknowledges that the observed groundwater contamination is stratified. Tests in stratified aquifers often require nested observation wells so the drawdown at different depths in the aquifer can be measured while maintaining the same horizontal distance from the extraction well. Without nested wells, the degree of hydraulic connection between water bearing zones cannot be evaluated. The Work Plan should discuss how the interpretation of the aquifer tests will account for vertical stratification and how they will be corrected for partially penetrating wells and/or wells screened in multiple zones.

5. In many instances, the Work Plan and associated appendices do not include enough specific information to understand what will be done and how the field crew will specifically implement it. Since this Work Plan also includes the Field Sampling Plan, this is the only documentation the project team and the field crew will have to ensure the work is performed properly. The following specific comments address many of the items that need to be addressed.

SPECIFIC COMMENTS

1. **Section 3.3, Decision Inputs, Page 3-2:** Because agricultural pumping may impact the aquifer test result, this section should acknowledge that such influences should be one of the decision inputs for the aquifer tests. Please include the effect of agricultural pumping as one of the decision inputs and describe how agricultural pumping may affect the aquifer test results.

2. **Section 3.7.1 Aquifer Testing and Contaminant Evaluation, Page 3-3:** The Work Plan does not include detailed figures showing the geometric relationship between each proposed extraction well and its associated observation wells and how the wells are oriented in relation to measured groundwater flow directions. Figures to scale, showing the orientation of the monitoring points for the aquifer tests are very important for determining if the placement of the observation wells is correct. Each aquifer test should include observation wells located down gradient and cross gradient of the extraction well so the anisotropy of the aquifer can be evaluated. Here, or in another section of the Work Plan, please provide detailed figures for each aquifer test illustrating the orientation of the extraction well and observation wells with respect to measured groundwater flow directions.

3. **Appendix A, Draft Sampling and Analysis Plan, Section 2.2.3, Aquifer Test, Pages A-8 through A-10:** This section should be revised to include the following: (1) proposed locations for at least two observation wells (cross gradient and down gradient) that are located less than 50 feet from the extraction well, (2) how possible precipitation events will be measured during the aquifer tests, (3) how barometric pressure changes will be monitored during the aquifer tests, (4) how it will be ensured that a constant groundwater extraction rate will be maintained during each aquifer test, (5) how and how often the groundwater extraction flow rate will be measured, (6) how much the groundwater extraction flow rate can deviate before the test must be restarted, (7) where control

observation wells are located so regional groundwater fluctuations can be monitored before, during and after each test, (8) how often manual measurements of groundwater elevation will be taken, (9) what wells will have pressure transducers installed in them, (10) how vertical aquifer stratification will be accounted for during the aquifer tests, (11) detailed figures showing the configuration of the extraction wells and observation wells for each aquifer test, and (12) how the aquifer tests will monitor and incorporate agricultural groundwater extraction if it occurs during the aquifer tests.

4. **Appendix A, Draft Sampling and Analysis Plan, Section 2.2.4, Groundwater Enhancement Using SVE, Pages A-10 through A-13:** This section does not include sufficient detail to understand what will be done, or specifically how the field crew will implement it. Please revise the Work Plan to include: (1) how it will be determined when steady state conditions are achieved, (2) how and how often drawdown will be measured, (3) where a control observation well is located to measure regional fluctuations, (4) how soil gas samples will be collected, and (5) the locations for all analytical sampling to be performed.

5. **Appendix A, Draft Sampling and Analysis Plan, Section 2.3.2.1, Passive Diffusion Bag Sampling, Page A-14:** Considering the experimental nature of this technology for vertical profiling of groundwater contamination in wells screened across multiple stratigraphic zones, the text in this section is not adequate. The Project Procedure for Passive Diffusion Bag Samplers included in Appendix C provides more general details, but is still not specific to this project, and contains limited information on exactly how to perform vertical profiling using PBD sampling. The Work Plan should specifically document how the PDB sampling will be performed so the field crew knows exactly what to do in the field. In addition to providing detailed field methodology for how this sampling technique will be used at Site 24, please revise the Work Plan to note the specific depth each PDB sampler will be placed in the field in relation to stratigraphic zones, observed contamination and screen length, exactly how the PDB samplers will be set at each depth, how long the PDB samplers will be left in place, and what procedures will be used to minimize cross contamination between samples.

   In addition, since many of the well screens effectively connect multiple stratigraphic zones, it is appropriate to evaluate where it is anticipated that the majority of the groundwater enters the well screen and provide rationale for how this will be factored into the PDB sampling effort. For example, if the PDB samplers are placed vertically in the well to target fine-grained zones that may contain contamination, the amount of groundwater flowing through these fine-grained zones may be minimal relative to the amount of groundwater flowing through coarser-grained zones located above and below the PDB sampler. This could bias the sampling effort so the measured concentrations are more representative of the coarser-grained zones, when the actual goal of the PBD sampling effort was to determine if contamination is concentrated in the finer-grained zones. In a second Appendix A titled Technical Notes, a large number of PDB sampling limitations are noted. The list of limitations includes a discussion of well screens that transect zones of different hydraulic head. In this section, borehole flow meter testing is given as a possible way to gain insight into where groundwater is entering the well screen. However, none of these limitations, or possible remedies, are discussed in the

Work Plan. The Work Plan should specifically discuss all possible limitations of this sampling method in relation to the objectives of the proposed PDB sampling at Site 24, and provide a way to evaluate in the field if sample bias is occurring.

6. **Appendix A, Draft Sampling and Analysis Plan, Section 2.3.7, Aquifer Test, Pages A-16 through A-17:** This section lacks key information (e.g., flow rate monitoring, precipitation monitoring, irrigation well monitoring, control well monitoring). Refer to previous comments for the type of detailed information that should be included. When the field crew reads this section there should be no ambiguity regarding specifically when, how, or what needs to be done during each aquifer test.

7. **Appendix A, Draft Sampling and Analysis Plan, Section 2.3.8, Groundwater Remediation Enhancement Using SVE, Page A-17:** The text in this section does not include enough detail to understand what will be done or specifically how the field crew will implement it. Please include the following information: (1) where and how often manual water levels will be collected, (2) how often drawdown will be measured in wells installed with data transducers, (3) where a control observation well is located to measure regional fluctuations.